


CCT 2003 (Kobe)



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Is bypass surgery needed  
for elderly patients with LMT disease?  
— From the surgical point of view —

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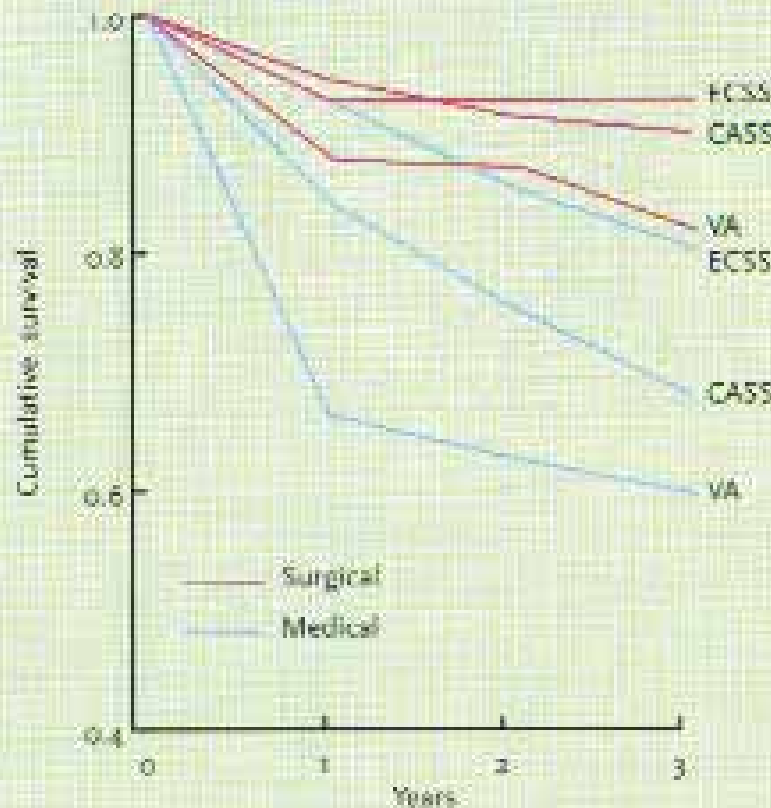
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### Medical vs Surgical Treatment for LMCA Disease in the VA, CASS, and ECSS Trials



**Figure 5.8** A comparison of medical and surgical treatment in the VA, CASS, and ECSS studies. (Reprinted by permission of the publisher from Chaitman et al. Effect of coronary artery bypass surgery on survival patterns in subsets of patients with left main coronary artery (LMCA) disease. *Am J Cardiol* 1981;48:765-776. ©1981 by Excerpta Medica Inc.)





# Randomized Trials (PCI vs CABG)

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	PCI	CABG
Mortality	◎	△
Cardiac Events	△	◎
Long-Term Survival	○	○



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# PCI for Unprotected LMT disease

O'Keefe JH et al. *Am J Cardiol* 1989;64:144-147

Technical feasibility  
3-year mortality: 64%

Ellis SG et al. *Circulation* 1997;96:3867-3872

Initial report from the ULTIMA registry (n=107)  
6-months mortality: 10.6%

Park S-J et al. *J Am Coll Cardiol* 1998;31:37-42

42 patients with normal LV  
In-hospital mortality: 0%  
Restenosis (unstable AP): 17% within 2 months

Tan WA et al. *Circulation* 2001;104:1609

ULTIMA registry (n=279)  
Hospital mortality: 13.7%, 1-year mortality: 24.2%  
For low risk group (32%)  
In-hospital mortality: 0%, 1-year mortality: 3.4%



# CABG for patients with LMT disease

Ellis SG et al. Am Heart J 1998;135:335-338

In-hospital mortality: 2.3%

3-year mortality: 15.6%

STS National Database 1997

In-hospital mortality: 2.8%

Annual Report 2003 from JACAS

In-hospital mortality (elective):

1.12% (LMT only)

0.91% (LMT + 1VD)

1.68% (LMT + 2VD)

1.68% (LMT + 3VD)



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# Recent Evolution of Techniques and Devices

## PCI

Rotational Coronary Atherectomy  
Directional Coronary Atherectomy  
New Stents (Drug Eluting Stents)  
GP IIb/IIIa receptor blockers  
PCPS

## CABG

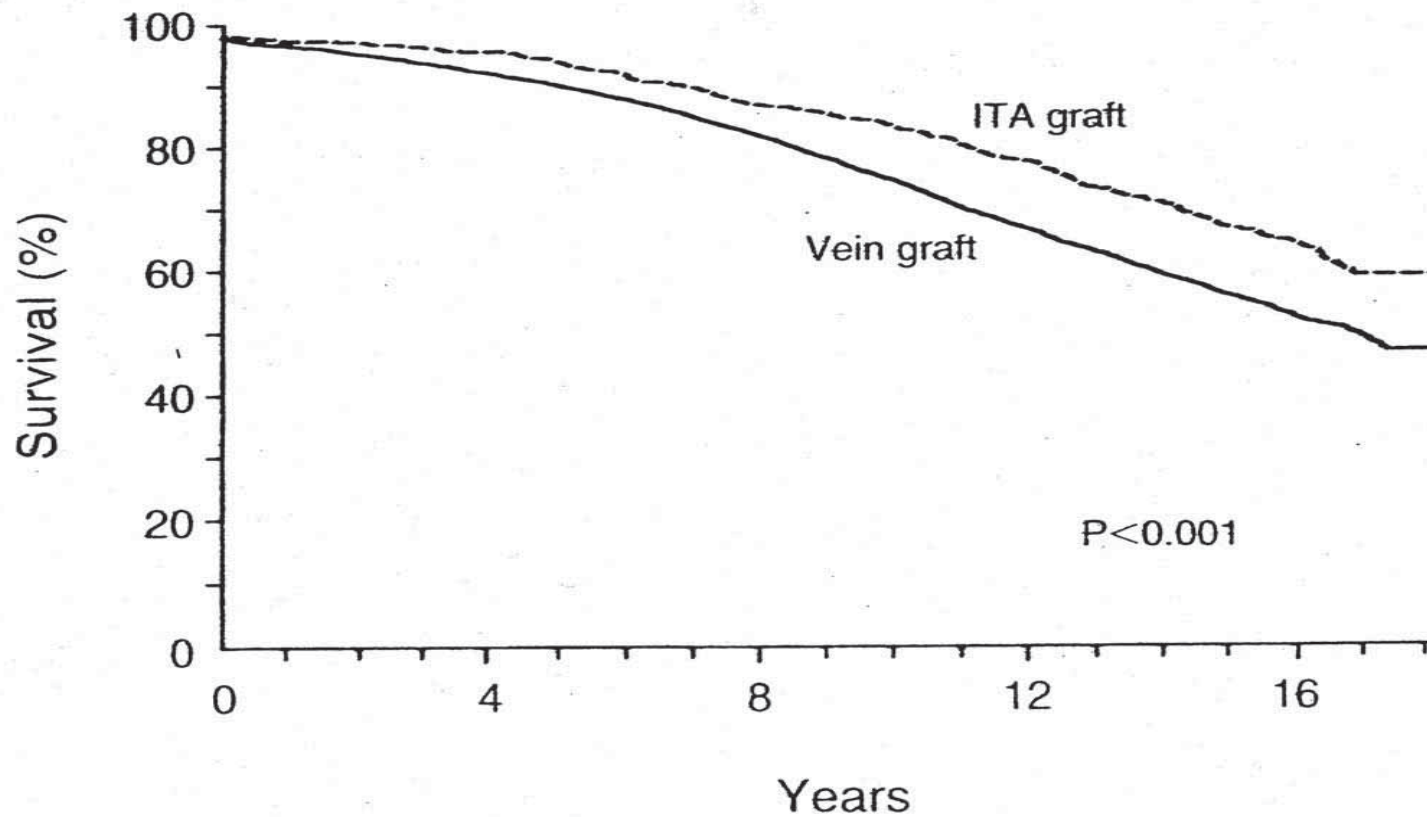
Aggressive use of arterial conduits  
Off-Pump CABG techniques



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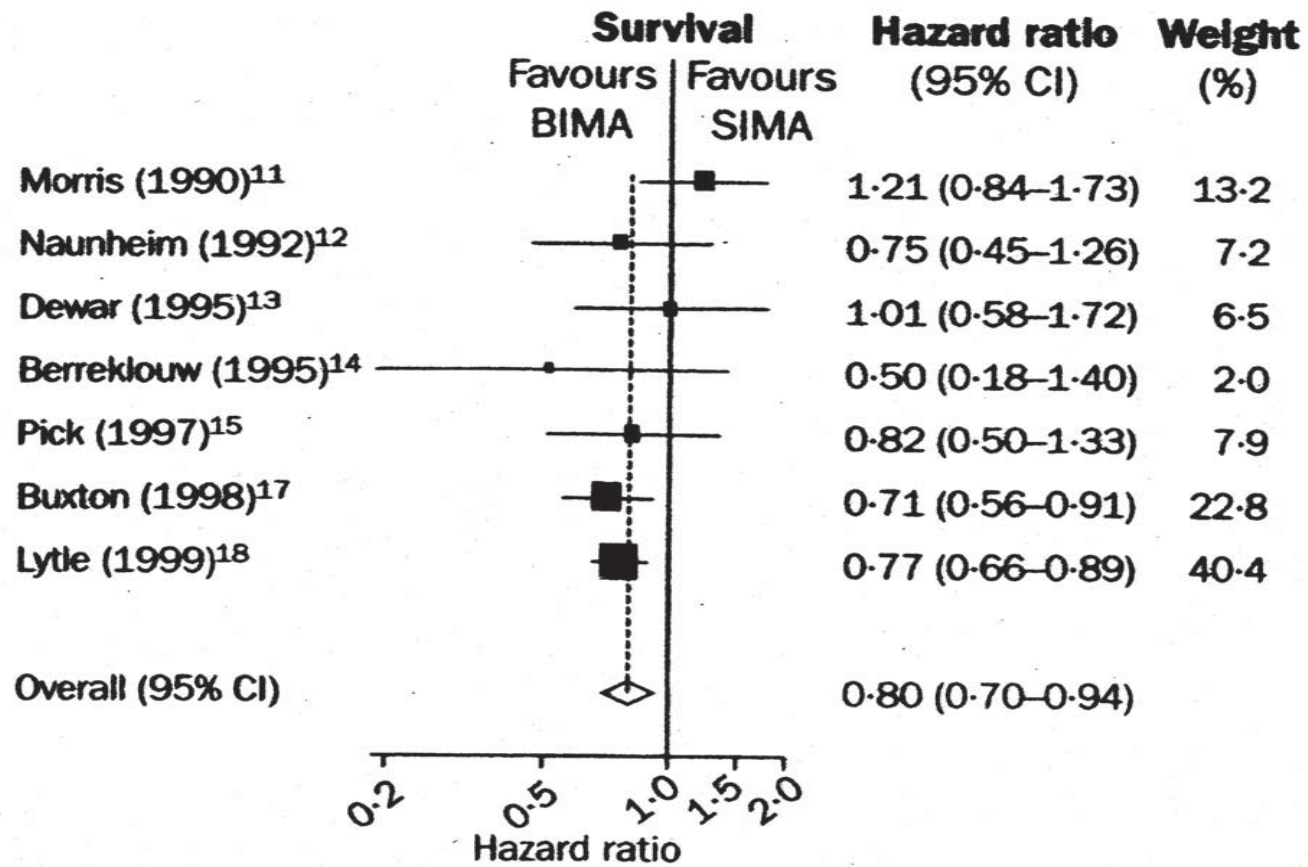
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# Coronary bypass surgery with internal-thoracic-artery grafts -Effects on survival over a 15-year-period Cameron A et al. N Engl J Med 1996;334:216-219



# Effect of arterial revascularization on survival: a systematic review of studies comparing bilateral and single internal mammary arteries

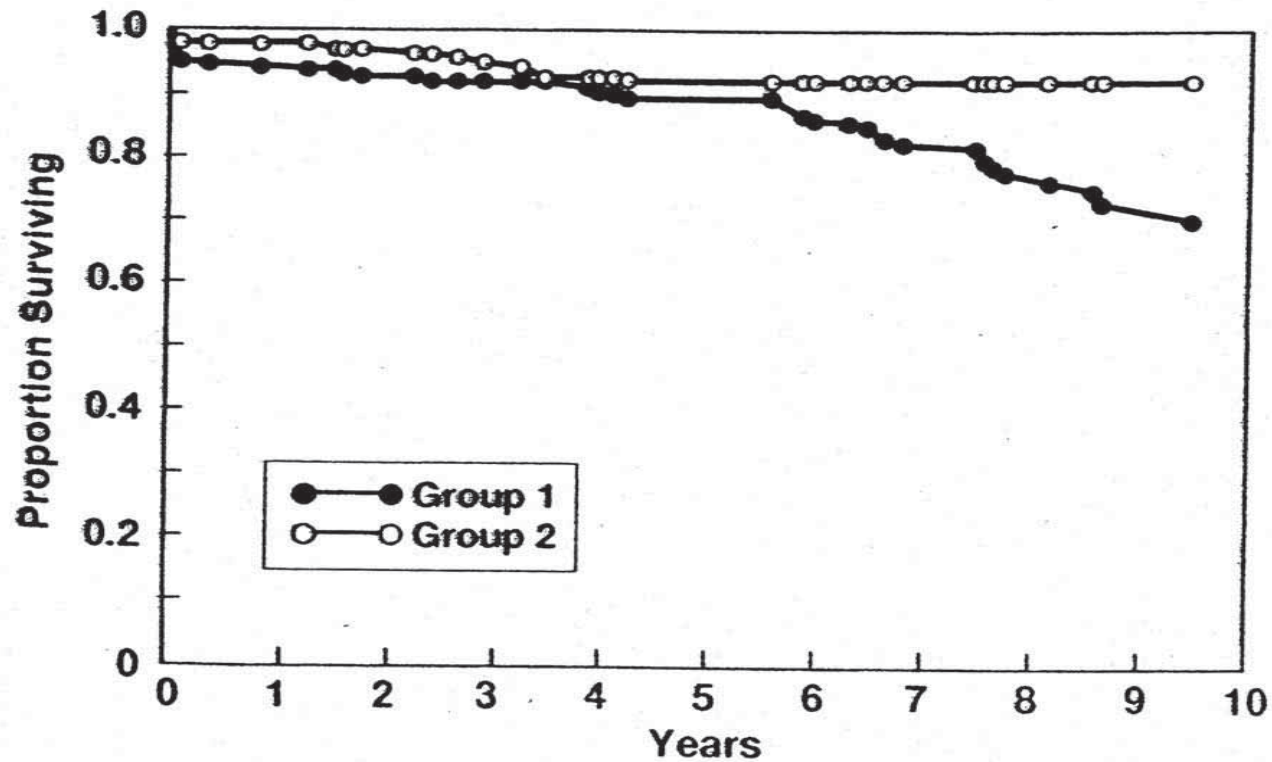
Taggart DP. Lancet 2001;358:870-875

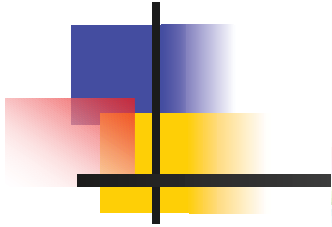
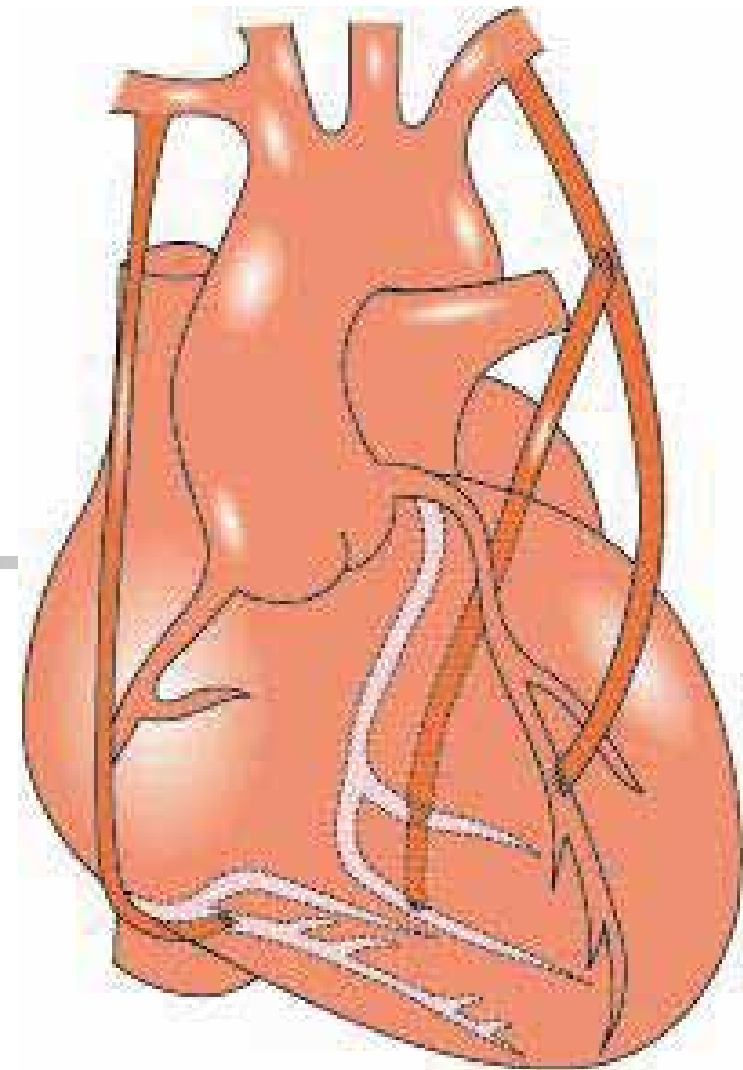
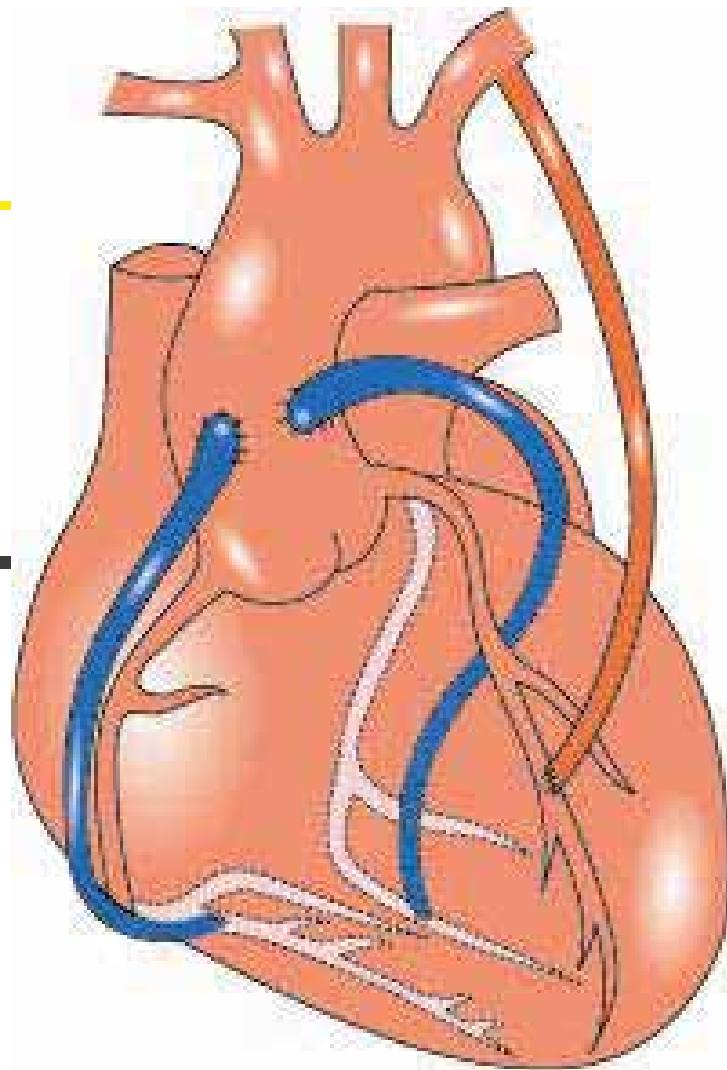


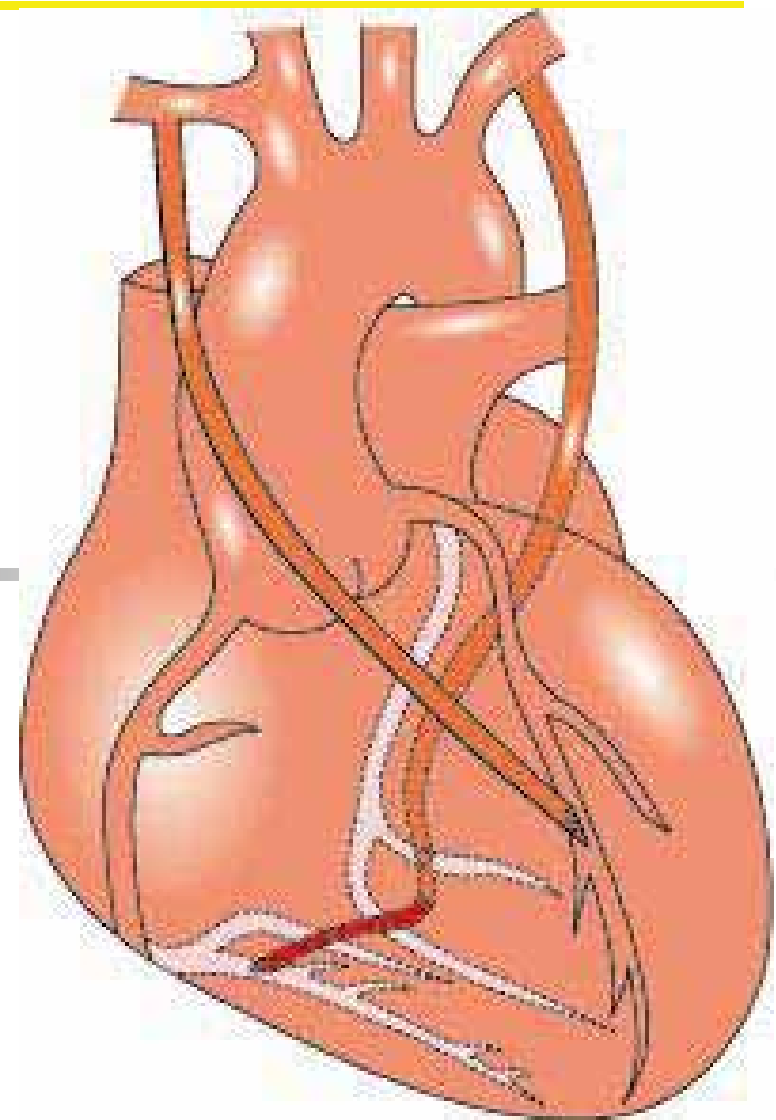
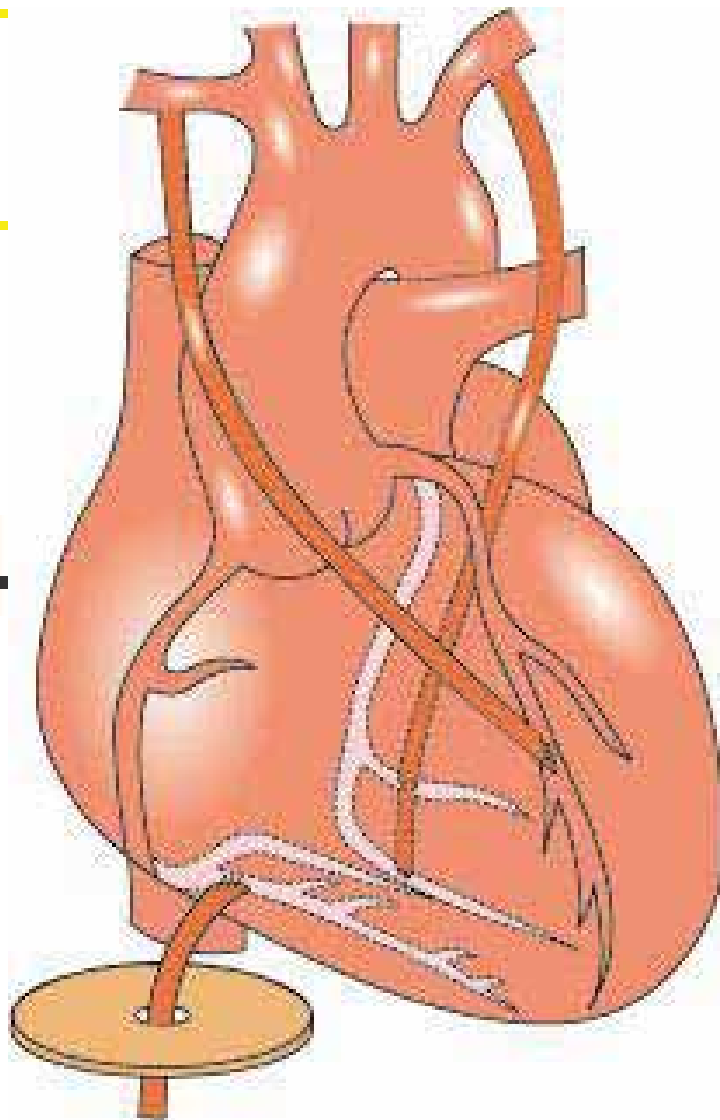


# Improved survival with multiple left-sided bilateral internal thoracic artery grafts

Schmidt SE. Ann Thorac Surg 1997;64:9-15







# Off-Pump CABG (Personal Experience, HY)

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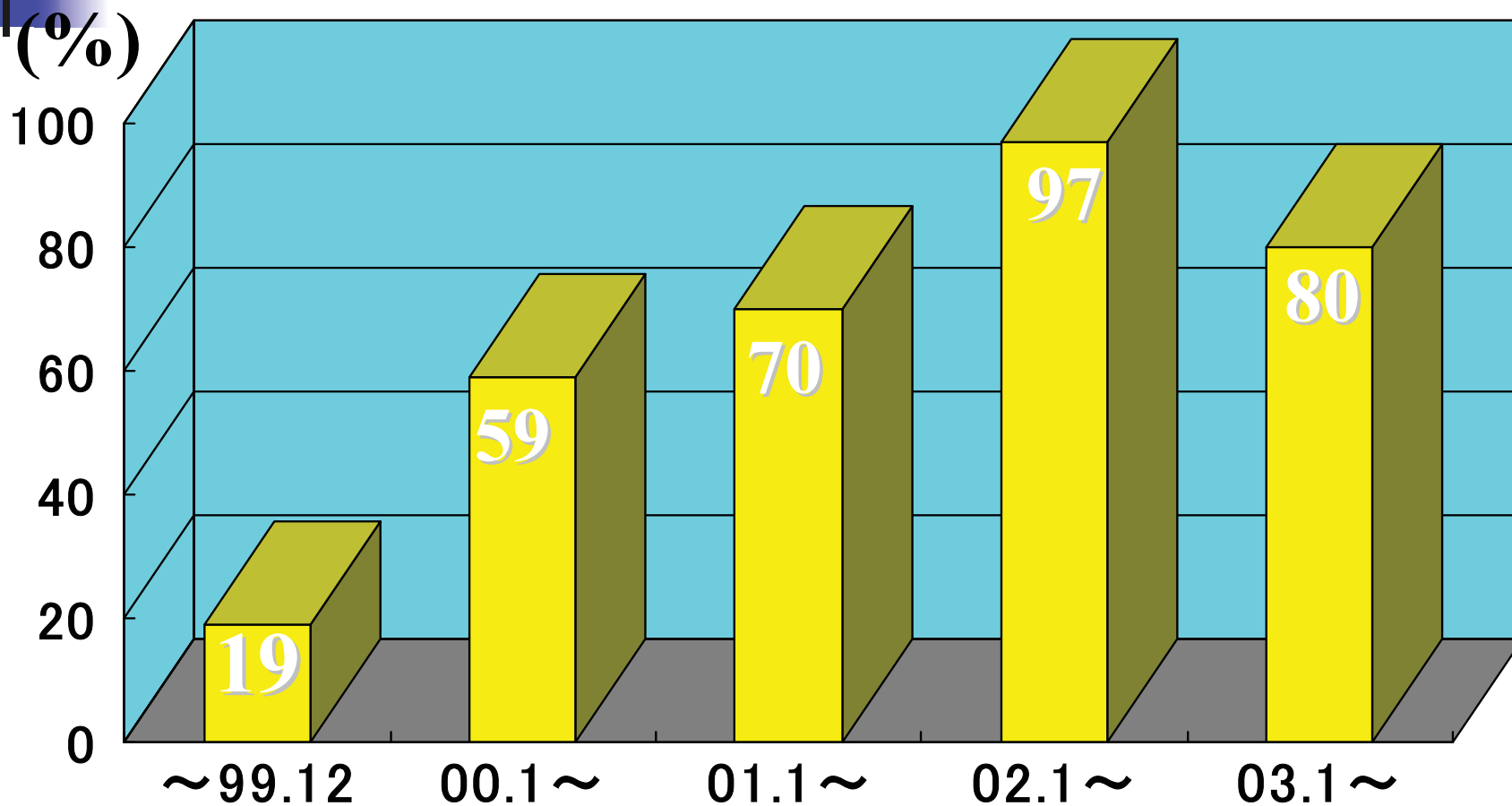
Kyoto Prefectural University of Medicine (Kyoto)	310	cases
Takahashi Hospital (Kobe)	129	cases
Kyoto Miniren Chuo Hospital (Kyoto)	47	cases
Saiseikai Suita Hospital (Osaka)	13	cases
Makiminato Central Hospital (Okinawa)	10	cases
Uemura Hospital (Kagoshima)	5	cases
Marutamachi Hospital (Kyoto)	4	cases
Kumamoto Red Cross Hospital (Kumamoto)	2	cases
<hr/>		
Total	520	cases



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# % of Off-Pump CABG in Isolated CABG (Kyoto Prefectural University of Medicine)





# Questions

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- Less Invasive?  
Operative Mortality & Morbidity
- Quality of Grafting?  
Graft Patency  
Long-term Results





## Subjects (Kyoto Prefectural University of Medicine)

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### ■ Off-Pump CABG (1997.3-2003.6)

Consecutive **311** cases (including MIDCAB)

### ■ On-Pump CABG (1998.1-2003.6)

Consecutive **198** cases (isolated CABG)

Aortic Cross Clamp (+)      127 cases

(-)      71 cases



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# Patients Characteristics

	Off-Pump CABG (n = 311)	On-Pump CABG (n = 198)	p value
<b>Age (years)</b>	68 ± 10	65 ± 9	< 0.001
<b>Sex (M:F)</b>	235 : 76	142 : 56	NS
<b>Cerebrovasc Dis</b> (> moderate risk)	177 (56%)	60 (30%)	< 0.001
<b>Renal Dysfunction</b> (Cr > 1.5 mg/dl)	33 (11%)	7 (4%)	< 0.05
<b>DM</b>	139 (44%)	78 (39%)	NS
<b>Emergent/Urgent</b>	136 (43%)	71 (36%)	NS
<b>No. of Cor Dis</b>	2.3 ± 0.7	2.5 ± 0.7	NS
<b>LMT Lesion</b>	112 (36%)	67 (34%)	NS
<b>LVEF (%)</b>	61 ± 15	57 ± 15	< 0.05
<b>Pre Op IABP</b>	14 (5%)	14 (7%)	NS





# Early Results

Off-Pump CABG  
(n = 311)

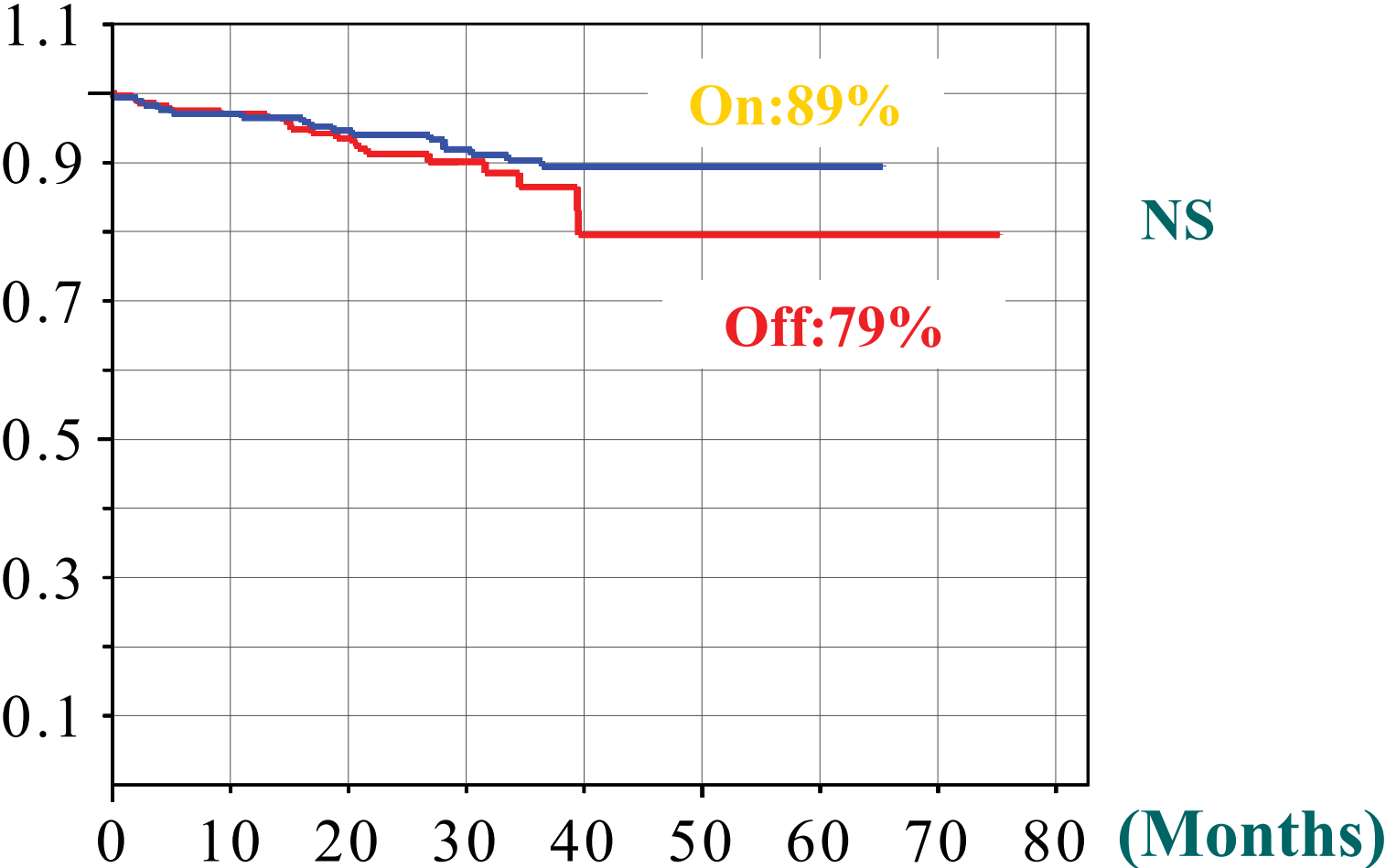
On-Pump CABG  
(n = 198)

	Off-Pump CABG (n = 311)	On-Pump CABG (n = 198)	p value
LOS	17 (5%)	9 (5%)	NS
PMI	14 (4%)	11 (6%)	NS
<b>CKMB max (IU/dl)</b>	<b>27 ± 44</b>	<b>49 ± 71</b>	<b>&lt; 0.001</b>
Circ Support	5 (2%)	8 (4%)	NS
Af	80 (25%)	23 (11%)	NS
Renal Dysfunction	53 (17%)	20 (10%)	NS
Cr max (mg/dl)	1.35 ± 1.15	1.4 ± 1.1	NS
<b>Prolonged Ventilation</b>	<b>12 (4%)</b>	<b>16 (11%)</b>	<b>&lt; 0.01</b>
Mediastinitis	0 (0%)	0 (0%)	NS
CRP max (mg/dl)	20 ± 7	19 ± 6	NS
<b>Stroke</b>	<b>0 (0%)</b>	<b>4 (2%)</b>	<b>&lt; 0.05</b>
<b>Intraop</b>			
<b>Postop</b>	3 (1%)	2 (1%)	NS
TIA	2 (0.6%)	3 (2%)	NS
Mortality	1 (0.3%)	1 (0.5%)	NS



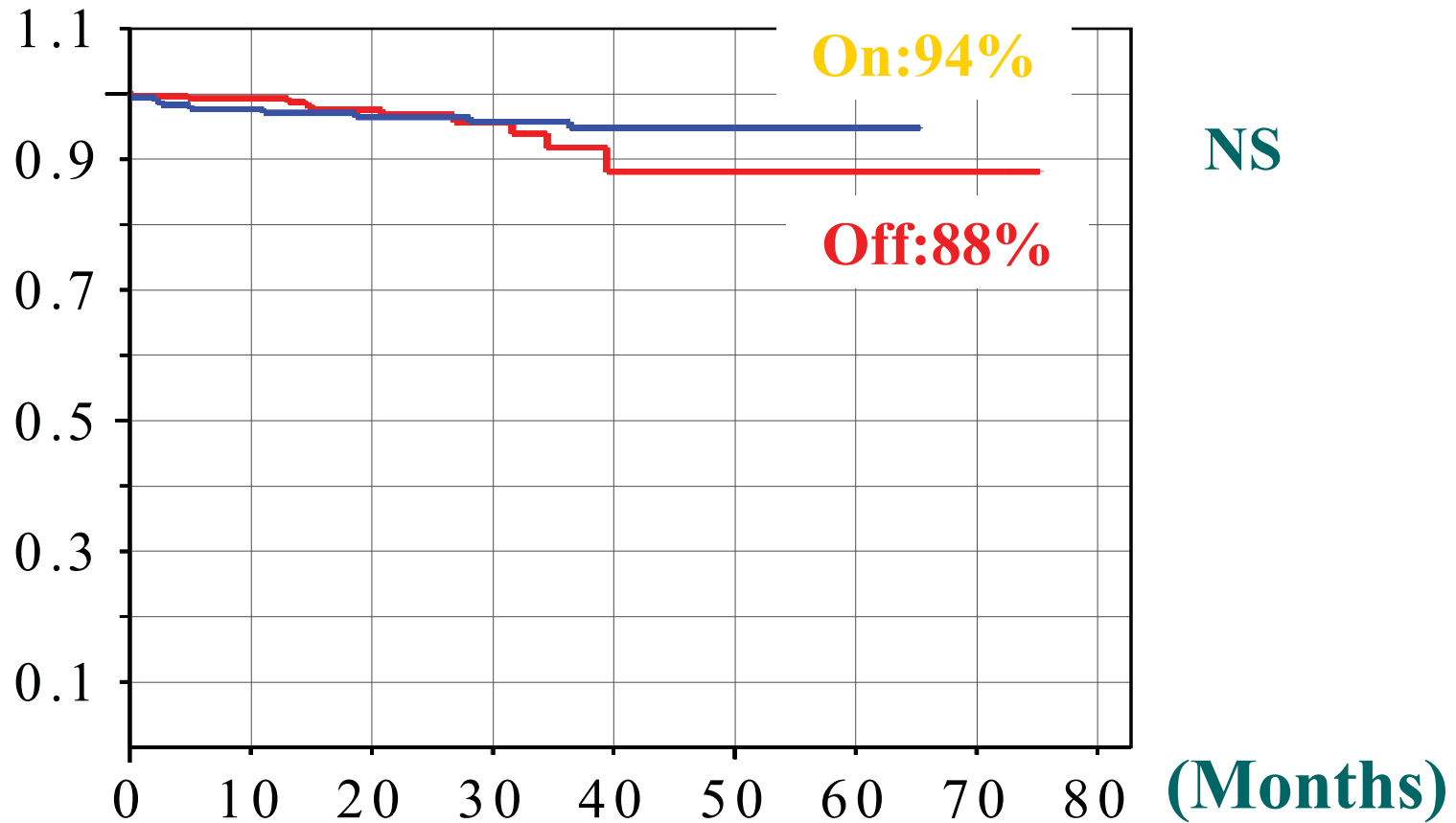
# Survival

(rate)



# Freedom from Cardiac Death

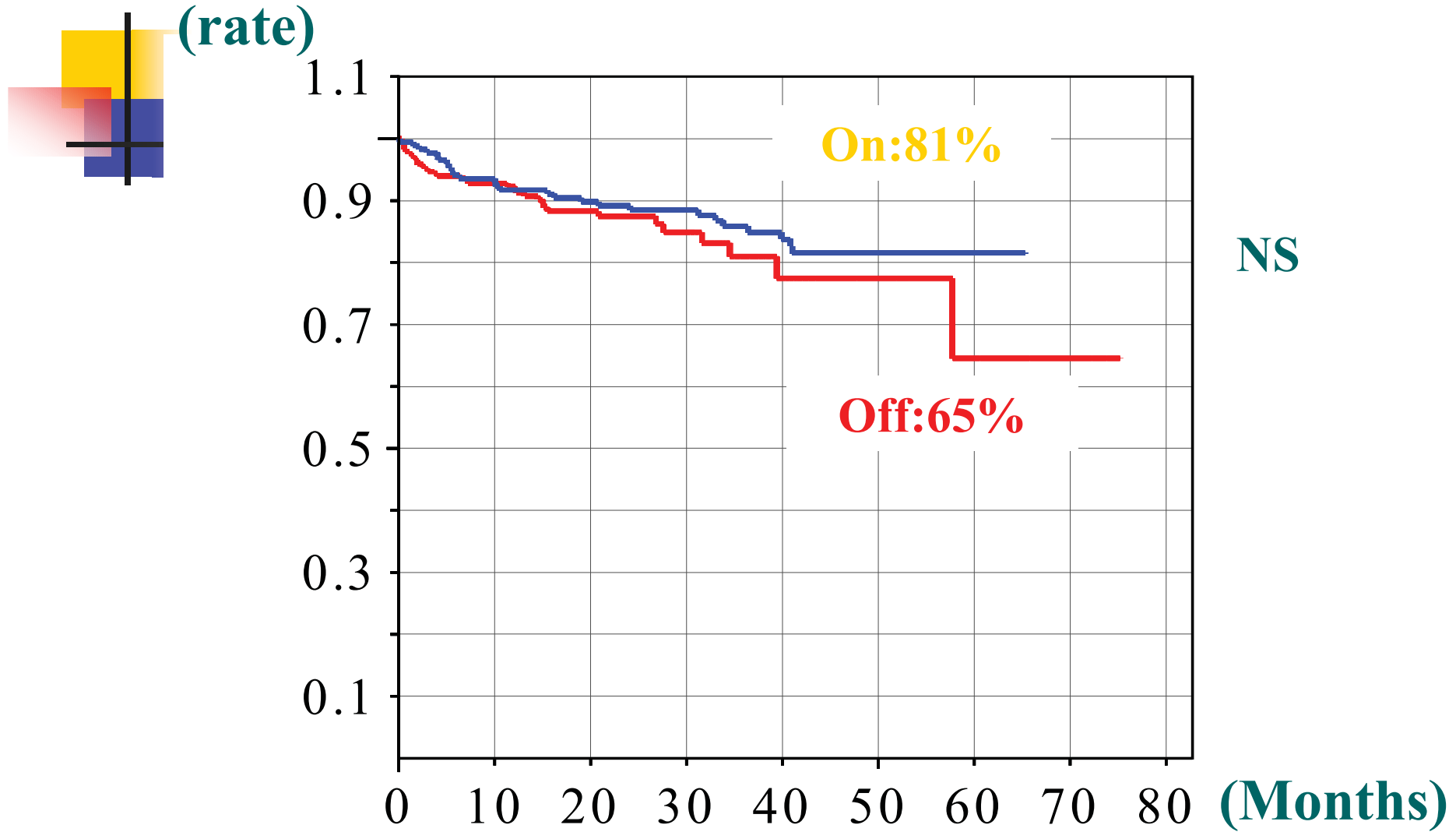
(rate)



NS

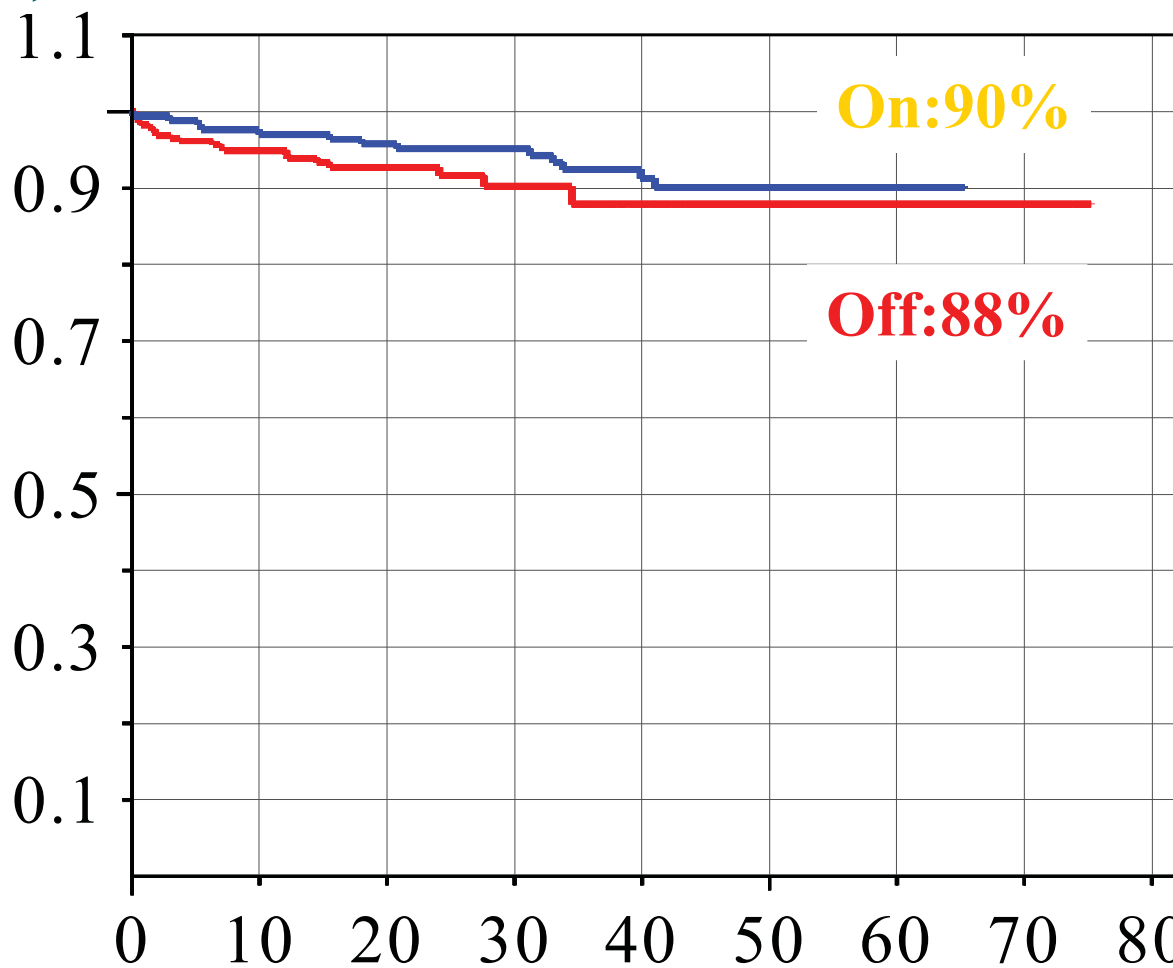


# Freedom from Cardiac Events



# Freedom from PCI

(rate)



On:90%

NS

Off:88%

(Months)



# Clinical Risk Factors Affecting In-Hospital Adverse Events Outcomes (PCI)

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Advanced age

Female gender

Diabetes

Prior MI

Multivessel disease

**Left main or equivalent coronary disease**

A large area of myocardium at risk

Pre-existing impairment of LV or renal function

Collateral vessels supplying significant areas of myocardium  
that originate distal to the segment to be dilated



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# Risk Factors Affecting Hospital Outcomes (CABG)

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Urgency of operation

Advanced age

1 or more prior coronary bypass surgery

Left ventricular EF < 40%

Female sex

Peripheral vascular disease

Dialysis or creatinine > 2 mg/dl

COPD

Irrespective to  
Lesion site or Lesion Morphology



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# Patients Characteristics (Off-Pump CABG)

	LMT Lesion (+) (n = 113)	LMT Lesion (-) (n = 186)	p value
Age (years)	69 ± 10	67 ± 9	NS
Sex (M:F)	90 : 22	138 : 48	NS
Cerebrovasc Dis (> moderate risk)	69 (62%)	101 (54%)	NS
Renal Dysfunction (Cr > 1.5 mg/dl)	10 (9%)	21 (11%)	NS
DM	48 (43%)	84 (45%)	NS
<b>Emergent/Urgent</b>	<b>71 (64%)</b>	<b>61 (33%)</b>	<b>&lt; 0.001</b>
<b>No. of Cor Dis</b> 0.05	<b>2.5 ± 0.6</b>	<b>2.3 ± 0.8</b>	<b>&lt;</b>
LVEF (%)	63 ± 15	61 ± 15	NS
Pre Op IABP	8 (7%)	6 (3%)	NS





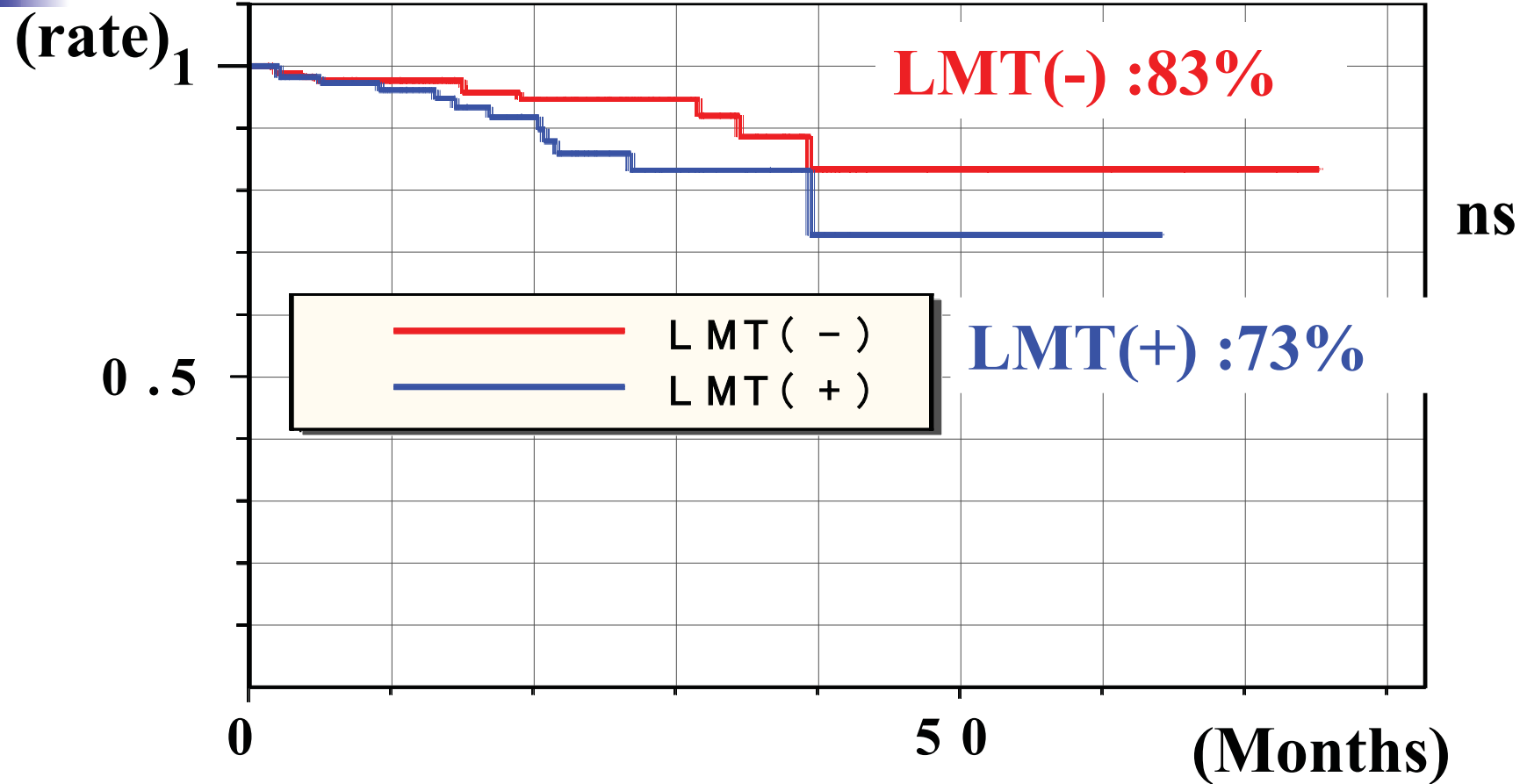
# Early Results (Off-Pump CABG)



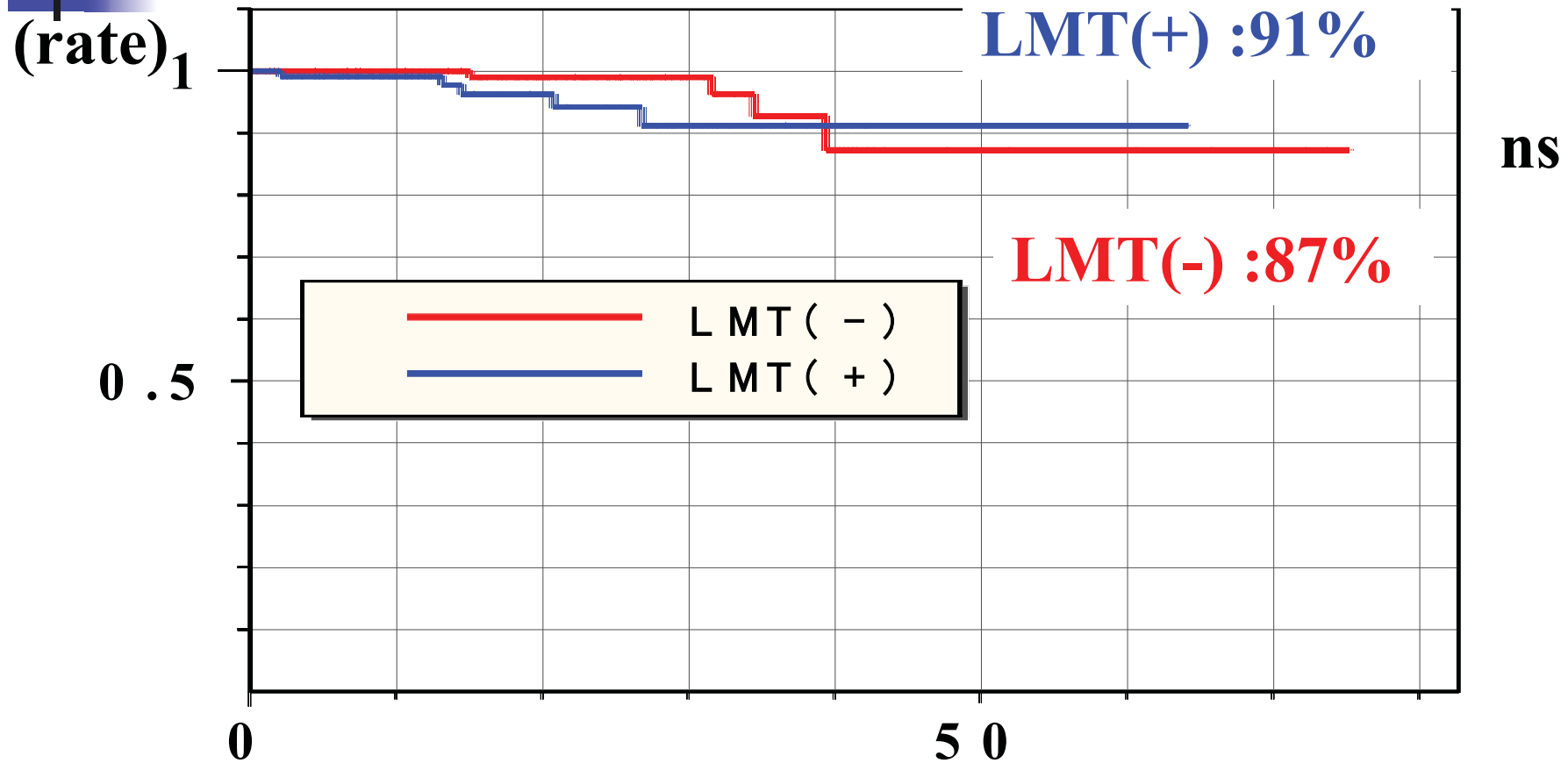
	LMT Lesion (+) (n = 113)	LMT Lesion (-) (n = 186)	p value
LOS	9 (8%)	9 (5%)	NS
PMI	9 (8%)	5 (3%)	< 0.05
CKMB max (IU/dl)	36 ± 57	21 ± 35	< 0.001
Af	32 (29%)	49 (26%)	NS
Renal Dysfunction	25 (22%)	28 (15%)	NS
Ventilation Time (hours)	14 ± 39	10 ± 26	NS
ICU Stay (days)	2.8 ± 2.5	2.7 ± 2.5	NS
Mediastinitis	0 (0%)	0 (0%)	NS
CRP max (mg/dl)	21 ± 7	20 ± 7	NS
Stroke Intraop	0 (0%)	0 (0%)	NS
Postop	2 (3%)	1 (0.5%)	NS
TIA	0 (0%)	3 (1.5%)	NS
Mortality	1 (0.9%) (pre op AMI)	0 (0%)	NS



# Survival (Off-Pump CABG)

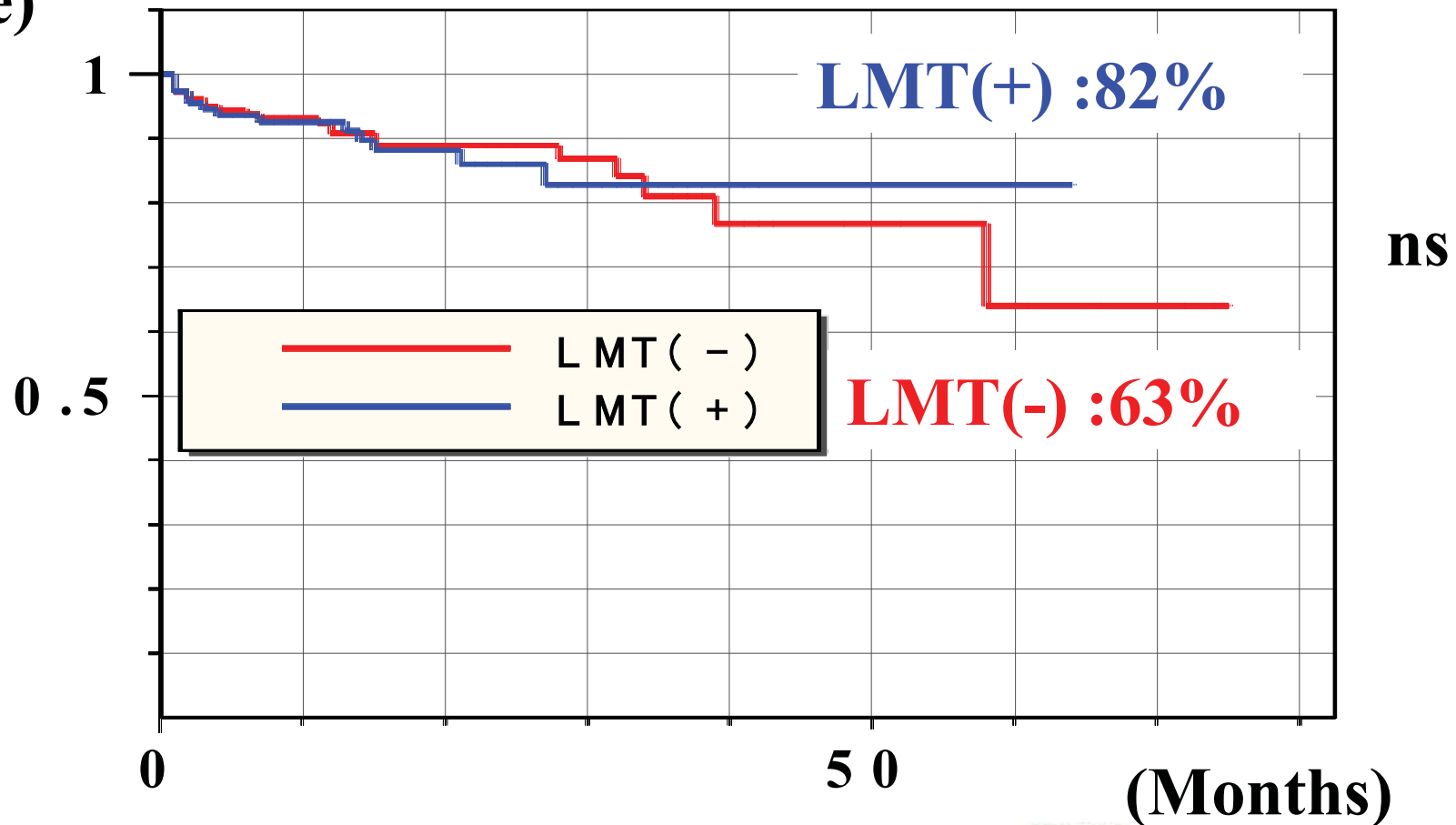


# Freedom from Cardiac Death (Off-Pump CABG)

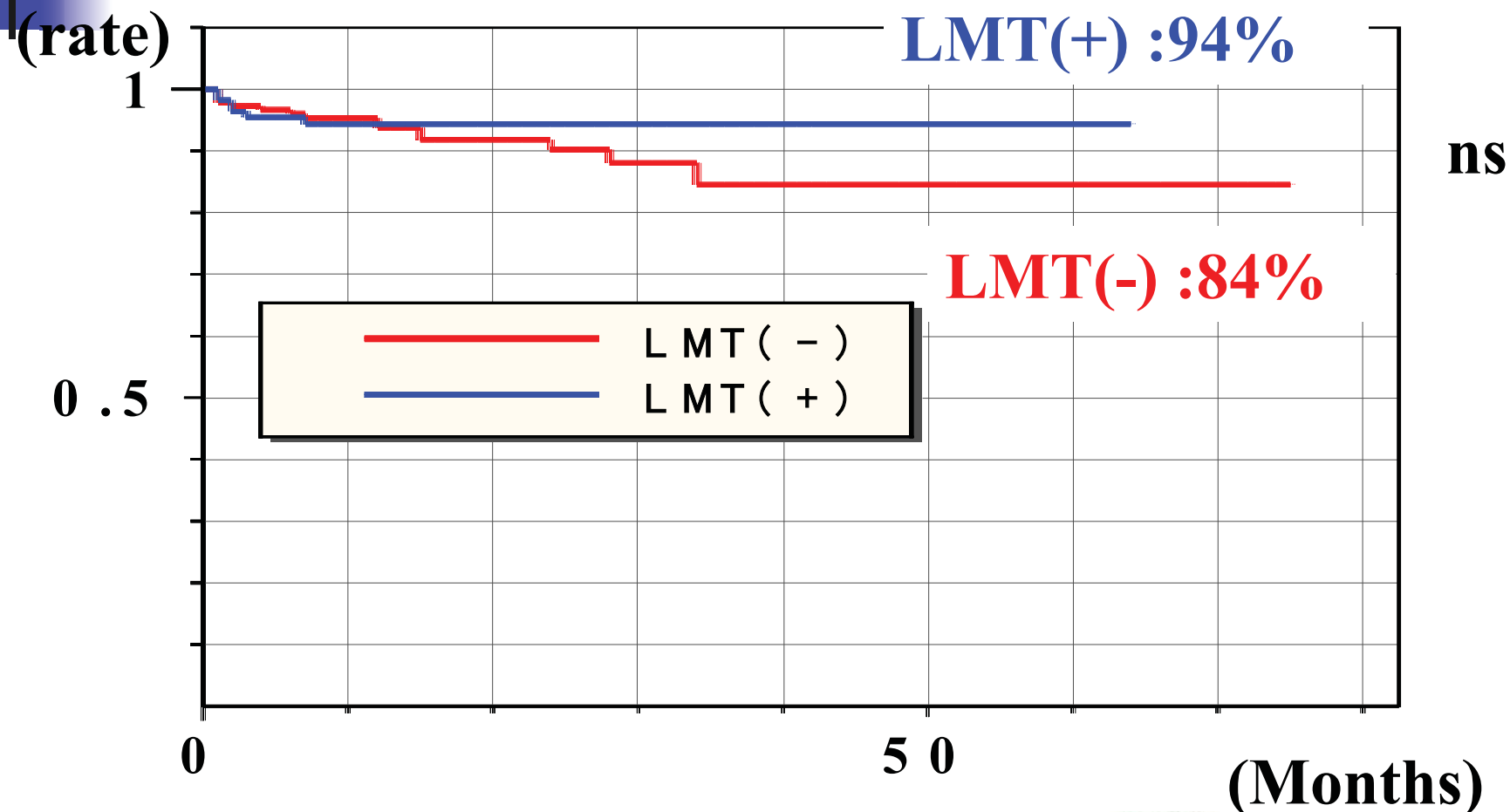


# Freedom from Cardiac Events (Off-Pump CABG)

(rate)



# Freedom from PCI (Off-Pump CABG)



# Patients Characteristics (Off-Pump CABG, LMT Lesion (+))

	Age $\geq$ 70 years (n = 61)	Age < 70 years (n = 52)	p value	
<b>Age (years)</b>	76 $\pm$ 4	62 $\pm$ 6	<b>&lt; 0.001</b>	
<b>Sex (M:F)</b>	45 : 16	46 : 6	<b>&lt; 0.05</b>	
<b>Cerebrovasc Dis</b> (> moderate risk)	42 (69%)	27 (52%)	NS	
<b>Renal Dysfunction</b> (Cr > 1.5 mg/dl)	5 (8%)	5 (10%)	NS	
<b>DM</b>	29 (48%)	19 (37%)	NS	
<b>Emergent/Urgent</b>	<b>49 (80%)</b>	<b>22 (42%)</b>	<b>&lt; 0.001</b>	
<b>No. of Cor Dis</b>	2.5 $\pm$ 0.6	2.4 $\pm$ 0.6	NS	NS
<b>LVEF (%)</b>	64 $\pm$ 17	61 $\pm$ 13	NS	
<b>Pre Op IABP</b>	4 (7%)	4 (8%)	NS	



# Early Results (Off-Pump CABG, LMT Lesion (+))

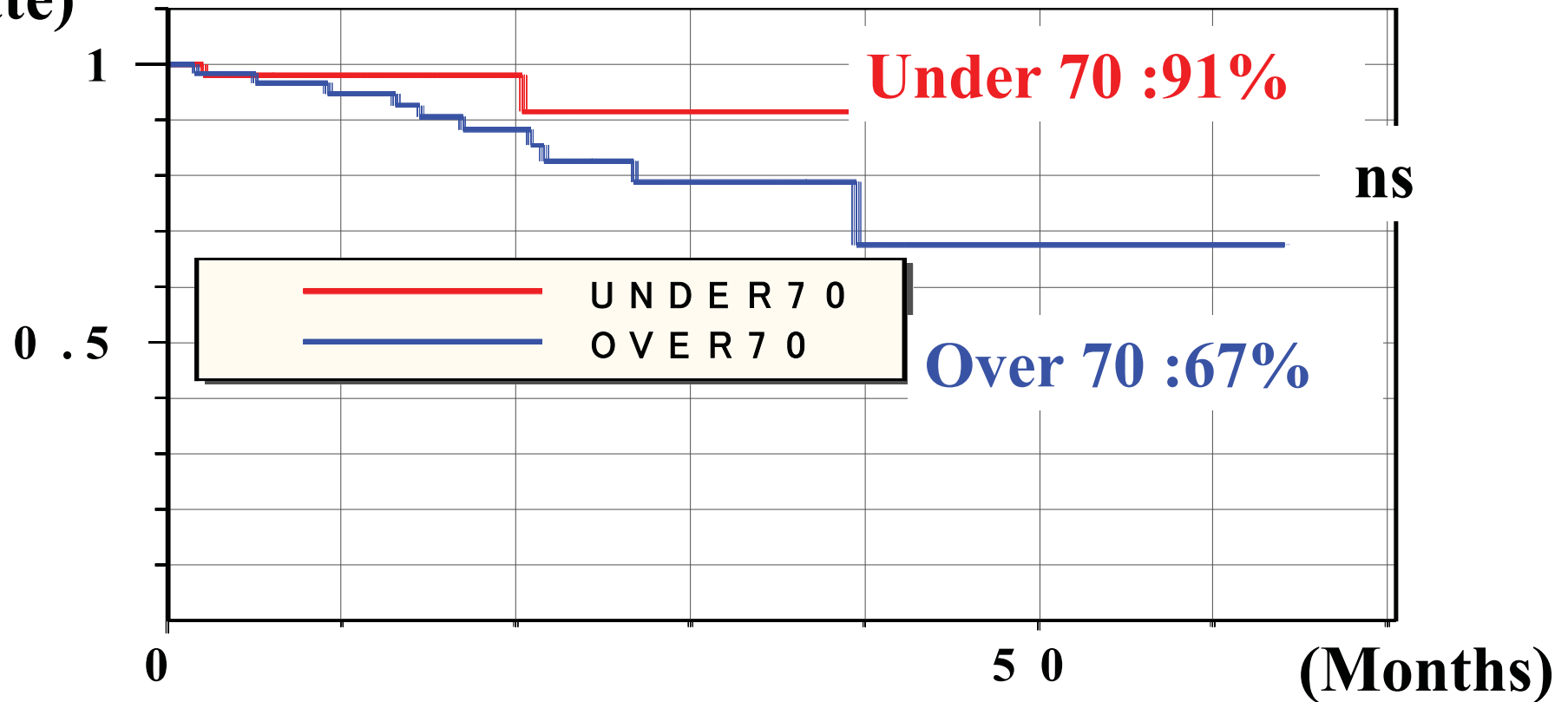


	Age $\geq$ 70 years (n = 61)	Age <70 years (n = 52)	p value
LOS	4 (7%)	5 (10%)	NS
PMI	3 (5%)	6 (12%)	NS
CKMB max (IU/dl)	31 $\pm$ 45	42 $\pm$ 69	NS
Af	19 (31%)	13 (25%)	NS
<b>Renal Dysfunction</b>	<b>18 (30%)</b>	<b>7 (13%)</b>	<b>&lt; 0.05</b>
Ventilation Time (hours)	14 $\pm$ 46	11 $\pm$ 29	NS
ICU Stay (days)	3.2 $\pm$ 2.8	2.5 $\pm$ 2.2	NS
Mediastinitis	0 (0%)	0 (0%)	NS
CRP max (mg/dl)	21 $\pm$ 7	20 $\pm$ 8	NS
Stroke Intraop	0 (0%)	0 (0%)	NS
Postop	2 (3%)	0 (0%)	NS
TIA	0 (0%)	0 (0%)	NS
Mortality	1 (1.6%) (pre op AMI)	0 (0%)	NS



# Survival (Off-Pump CABG, LMT Lesion (+))

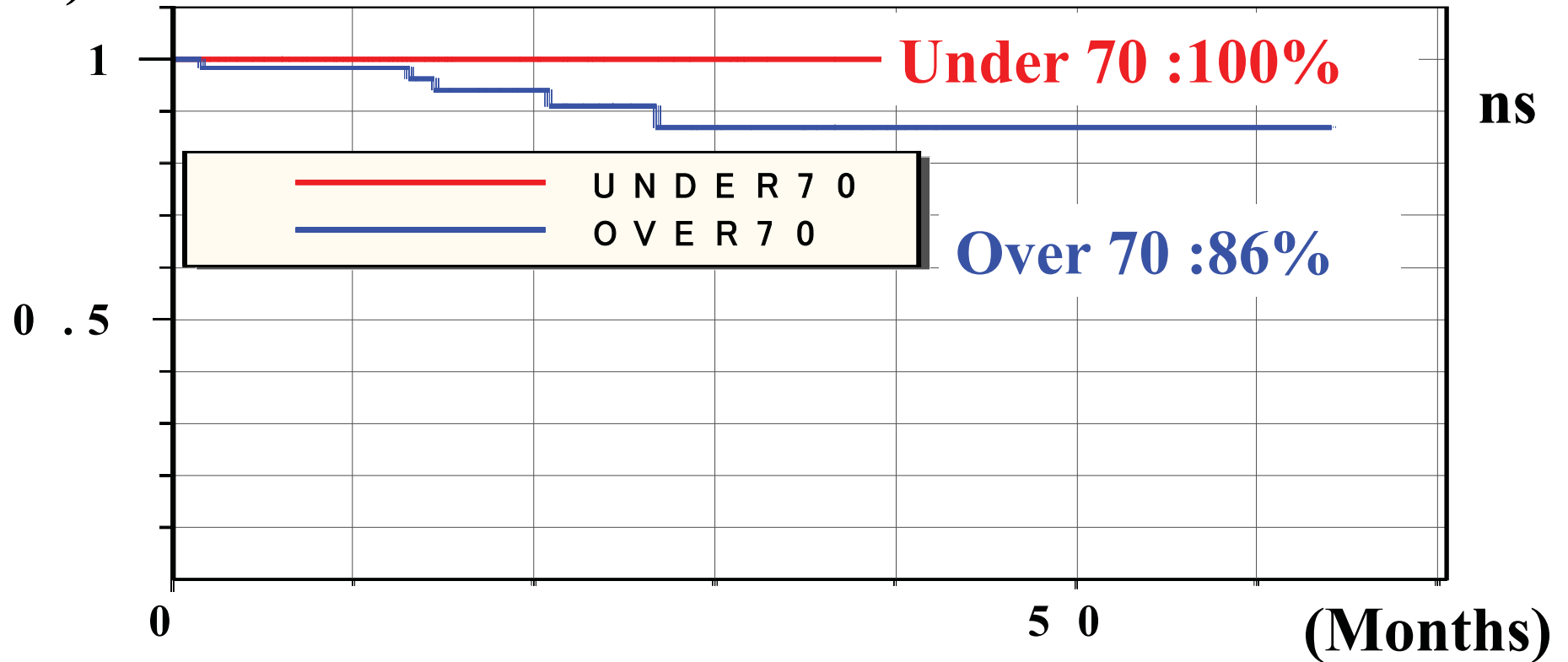
(rate)





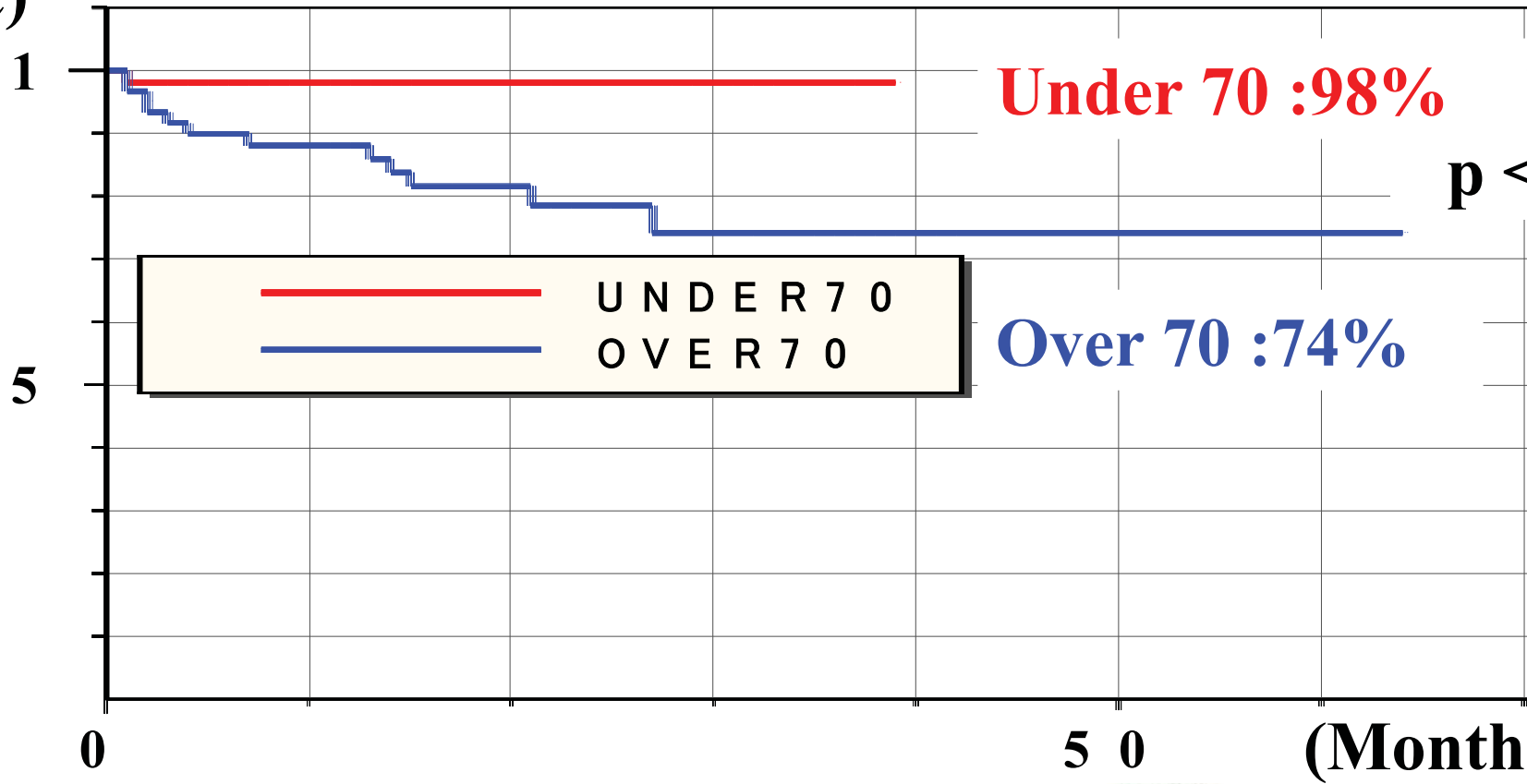
# Freedom from Cardiac Death (Off Pump CABG, LMT Lesion(+))

(rate)

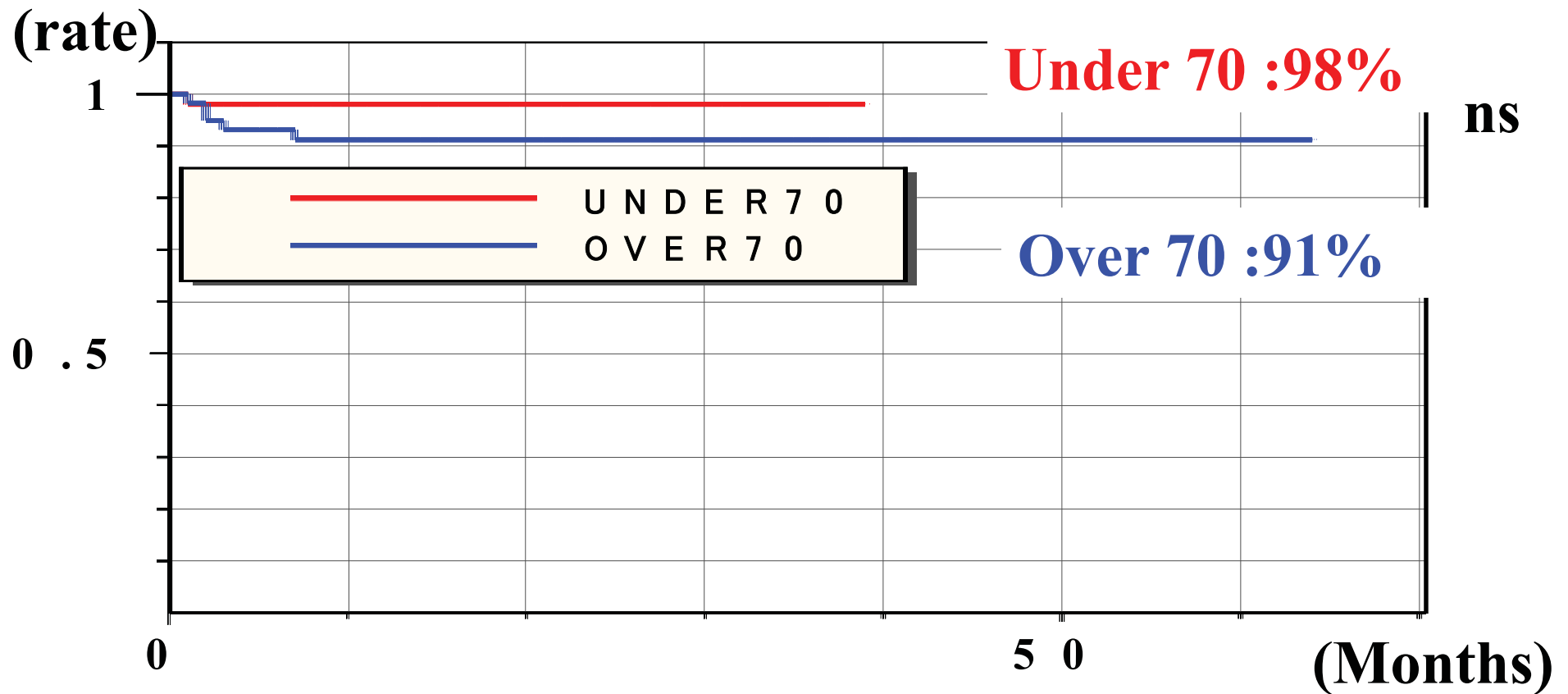


# Freedom from Cardiac Events (Off Pump CABG, LMT Lesion(+))

(rate)



# Freedom from PCI (Off-Pump CABG, LMT Lesion (+))



# Summary

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- The operative mortality, 1-year mortality, and 5-year mortality of Off-Pump CABG for patients with LMT disease were 0.9%, 3.5%, and 27%, respectively.
- The operative mortality, 1-year mortality, and 5-year mortality of Off-Pump CABG for elderly patients with LMT disease were 1.8%, 4.9%, and 33%, respectively.
- The operative mortality of Off-Pump CABG for patients with/without LMT disease without AMI was actually zero.



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# Conclusions

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- CABG can be performed even for elderly patients with LMT disease with reasonably low mortality and morbidity and good long-term results.
- CABG is a choice of care even for elderly patients with LMT disease as long as the patients is in a stable hemodynamic condition.



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